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vibration of the specimen and to produce an electrical signal, control means to receive the electrical signal, the control means determining the resonant frequency of the specimen from the electrical signal and sending a signal to the vibration excitation means to maintain the high cycle load at the resonant frequency of the specimen and means to store data of the test, said vibration excitation means comprising an actuator, said actuator being acoustically coupled to one of the first and second clamping means through a drive member comprising a drive arm and said actuator and said drive arm being located to one side of the said one of the first and second clamping means to apply the high cycle load transversely to the low cycle load, said drive member having a stiffness, said stiffness of the drive member being such that the mass of the drive member and actuator have a natural resonant frequency close to the resonant frequency of the specimen .

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(Amended) 14. A method of fatigue testing of materials using a device comprising a frame, first and second clamping means for holding a specimen to be tested, mounting means to mount the first and second clamping means on the frame, the mounting means vibrationally isolating the first and second clamping means from the frame, means to move at least one of the first and second clamping means to apply in use a low cycle load on the specimen in an axial direction, means to measure in the low cycle load to, electrical insulating means to electrically insulate the frame from the specimen, vibration excitation means acoustically coupled to one of the first and second clamping means to apply in operation a high cycle load on the specimen, said vibration excitation means comprising an actuator, said actuator being acoustically coupled to one of the first and second clamping means through a drive member comprising a drive arm and said actuator and said drive arm being located to one side of the said one of the first and second clamping means to apply the high cycle load transversely to the low cycle load, said drive member having a stiffness, said stiffness of the drive member being such that the mass of the drive member and actuator have a natural resonant frequency close to the resonant frequency of the specimen ,

means to measure the high cycle load, detector means to detect vibration of the specimen and to produce an electrical signal, control means to receive the electrical signal, the control means determining the resonant frequency of the specimen from the electrical signal and sending a signal to the vibration excitation means to maintain the high cycle load at the resonant frequency of the specimen and means to store data of the test, the method comprising the steps of:

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- (a) applying one of a low cycle load and a high cycle load to the specimen,
 - (b) maintaining the vibration of the specimen at its resonant frequency,
 - (c) detecting a drop in the resonant frequency of the specimen indicative of the initiation of a crack in the specimen,
 - (d) stopping the test and locating the crack,
 - (e) attaching probes to the specimen at each side of crack, the probes being arranged to produce a second electrical signal,
 - (f) supplying an electrical current through the specimen,
 - (g) resuming the test and maintaining the vibration of the specimen at its resonant frequency until failure of the specimen occurs,
 - (h) determining one of the rate of crack growth in the specimen from the second electrical signal and determining the life of the specimen to failure.

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(Amended) 24. A device for fatigue testing of materials comprising a frame, first and second clamping means for holding a specimen to be tested, mounting means to mount the first and second clamping means on the frame, the mounting means vibrationally isolating the first and second clamping means from the frame, means to move at least one of the first and second clamping means to apply in use a low cycle load on the specimen, means to measure the low cycle load, electrical insulating means to electrically insulate the frame from the specimen, vibration excitation means acoustically coupled to one of the first and second clamping means to apply in operation a high cycle load on the specimen, said vibration excitation means comprising an actuator, said actuator being acoustically coupled to one of the first and second clamping means through a

drive member comprising a drive arm and said actuator and said drive arm being located to one side of the said one of the first and second clamping means to apply the high cycle load transversely to the low cycle load, said drive member having a stiffness, said stiffness of the drive member being such that the mass of the drive member and actuator have a natural resonant frequency close to the resonant frequency of the specimen, means to measure the high cycle load, detector means to detect vibration of the specimen and to produce an electrical signal, control means arranged to receive the electrical signal, the control means determining the resonant frequency of the specimen from the electrical signal and sending a signal to the vibration excitation means to maintain the high cycle load at the resonant frequency of the specimen, probes being provided on the specimen in use and to produce a second electrical signal, means to supply an electrical current through the specimen, means to determine crack growth rate arranged to receive the second electrical signal and to determine the rate of crack growth in the specimen or determining the life of the specimen to failure .

Please amend claims 5, 7, 28, 30 and 32 as follows:

A⁷ (amended) 5. A device is claimed in claim 1 wherein the actuator is arranged to generate frequencies in the range of 50Hz to 5kHz.

A⁸ (Amended) 7. A device is claimed in claim 1 wherein the actuator is an electrodynamic, piezoelectric or a magnetostrictive actuator.

A⁹ (Amended) 9. A device as claimed in claim 8 wherein the heating means comprises a furnace surrounding the specimen.

A¹⁰ (Amended) 28. A device is claimed in claim 24 wherein the actuator generates frequencies in the range 50Hz to 5kHz.

A¹¹ (Amended) 30. A device is claimed in claim 24 wherein the actuator is an electrodynamic, piezoelectric or a magnetostrictive actuator.

A¹² (Amended) 32. A device as claimed in claim 31 wherein the heating means comprises a furnace surrounding the specimen.

